Claims

1. A process for producing a PEI particle foam, the process comprising:
extruding a composition consisting of 80% to 99.5% by weight of PEI, 0.5% to 10% by weight of blowing agent and 0% to 10% by weight of additives from an extruder with a perforated plate to give foamed pellets, where temperatures between intake zone and screw tip are within a range between 180 and 380°C, a temperature of the perforated plate is between 250 and 350°C, and a melt temperature on exit through the perforated plate is between 230 and 360°C,
guiding the composition on exit from the extruder into an underwater pelletizer designed to prevent foaming with regard to a combination of temperature and pressure to provide a pellet material laden with blowing agent; and
pre-foaming the pellet material with an energy selected from infrared radiation or microwave radiation, to form the PEI particle foam; ~~and~~
~~subsequently foaming the foamed pellets further to give the PEI particle foam~~
wherein the foamed PEI has a glass transition temperature between 180 and 215°C, and that the mean cell diameter of the particle foam is less than 2 mm.

2. The process according to Claim 1, wherein the additives are flame retardants, plasticizers, pigments, UV stabilizers, nucleating agents, impact modifiers, adhesion promoters, rheology modifiers, fibres and/or nanoparticles.

3. The process according to Claim 1 or 2, wherein the blowing agents comprise an alcohol, a ketone, an alkane, an alkene, CO2, N2, water, an ether, an aldehyde, chemical blowing agents or mixtures of two or more thereof.

4. The process according to at least one of Claims 1 to 3, wherein the particle foam has a tensile strength to ISO1926 of greater than 0.5 MPa, an elongation at break to ISO1926 of between 8% and 12%, a shear modulus to ASTM C273 at room temperature of greater than 8 MPa, a shear resistance to ASTM C273 at room temperature of greater than 0.45 MPa, a compressive modulus to ISO 844 at room temperature of greater than 13 MPa, and a compressive strength to ISO 844 at room temperature of greater than 0.4 MPa.

5. The process according to at least one of Claims 1 to 4, wherein the particle foam has been installed in the interior of an aircraft.

6. The process according to at least one of Claims 1 to 5, wherein the mean cell diameter of the particle foam is less than 500 µm.

7. Process for producing a composite part, wherein the particle foam produced by means of a process according to Claim 1 is bonded, sewn or welded to cover materials.

8. Process for producing a composite part, wherein the particle foam produced by means of a process according to Claim 1 is foamed in the presence of a cover material in such a way that it is bonded thereto by means of adhesive bonding or welding.

9. Process according to Claim 1, wherein the PEI on exit from the extruder is introduced into an optionally heated mould, optionally containing cover materials, and foamed with shaping to give a particle foam or a composite material.

10. Process according to at least one of Claims 1 to 9, wherein inserts and/or channels are incorporated into the particle foam during the foaming.